

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**SPRING DEVELOPMENT**

(No.)

**CODE 574**

**DEFINITION**

Utilizing springs and seeps to provide water for a conservation need.

**PURPOSES**

This practice may be applied as part of a resource management system to support one or more of the following purposes:

- improve the distribution of water.
- increase the quantity and quality of water for livestock, wildlife, or other uses.
- obtain water for irrigation if water is available in a suitable quantity and quality.

**CONDITIONS WHERE PRACTICE APPLIES**

In areas where spring or seep development will provide a dependable supply of suitable water for the planned times of use, and where the intended purpose can be achieved by using this practice alone or combined with other conservation practices.

**CRITERIA**

**General Criteria Applicable to All Purposes**

Spring developments shall be planned, designed, and constructed in compliance with federal, state and local laws and regulations.

Laws and regulations of particular concern include those involving water rights, land use, pollution control, property easements, wetlands, preservation of cultural resources, and endangered species.

Impacts to existing wetland functions shall be assessed. USDA wetland conservation provisions apply. The practice must comply with NRCS wetland technical assistance policy contained in 190–General Manual, Part 410.26.

An investigation of site conditions, including soil borings, shall be made. Water quality shall be determined to the extent required for the intended purpose. Water quantity shall be measured from existing flows, as practicable, to determine if the development will meet the purpose requirements.

**Fracture and tubular springs.** This type of spring is associated with cavernous rock. If water issues (flows) from rock fractures, the individual openings shall be cleaned and enlarged, as needed, to improve flow. The water from these individual openings shall be collected by means of tile or perforated pipeline or by a gravel-filled trench. The collection works shall be constructed an adequate distance below the elevation of the fracture openings to permit free discharge.

If water issues from a single opening, such as a solution channel in a soluble rock formation the opening shall be cleaned or enlarged as needed. A collection system usually is not required.

If a spring box or sump is used, it shall be installed at an elevation low enough that water yield is not restricted.

**Perched or contact springs.** Perched or contact springs occur when an impermeable layer lies beneath a water-bearing permeable layer. Collection trenches shall be used to intercept and divert flows from the water-bearing formation.

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**Artesian springs.** Artesian springs normally occur at a fissure or break in the impervious stratum with the water source being an underlying pervious water-bearing layer so positioned that the water surface elevation (water table) is always above the outlet point of the spring.

Remove obstructions, clean or enlarge joints or fractures, or lower the outlet elevation as needed to improve flow. The sump or spring box collection system shall be located to allow free outlet discharge or minimum restriction to the spring flow which will protect and maintain yield.

**Collection systems.** If a collection trench is used, the trench shall be constructed so that it extends into (but not through) the impervious layer. Minimum length of the trench shall be based on site conditions, preferably the entire length of the water-bearing outcrop.

A cutoff wall shall be constructed along the downstream side of the trench, if needed, to insure that the flow enters the collection system. The cutoff wall shall be constructed of plastic sheeting, well-tamped clay, masonry, concrete, or other impervious materials.

The collection system shall consist of subsurface drainage tubing or perforated pipe not less than 4 inches in diameter, wood box drain, or other suitable manufactured system. Surrounding the collector with geotextile fabric or a sand-gravel filter is recommended. Cleanouts are recommended for all collection systems.

Crushed rock or gravel backfill in a trench, not less than 1 foot thick, shall be used as a collection system if site conditions warrant, in lieu of other materials.

Sand, gravel, and crushed rock shall be composed of clean, hard, durable particles free of fines (less than No. 200 U.S. Standard sieve), carbonates or toxins.

**Spring boxes.** Spring boxes, if needed, shall be made of plastic, concrete, or other durable material, with a tight access cover and impervious floor. A "shoebox" type access cover (a cover with an edge projection overhanging the sides) or manhole attachment, with gasket, is recommended for water

tightness. The floor may be omitted when the underlying material is stable and impervious.

The boxes shall have a minimum cross-sectional area of 1-1/2 feet<sup>2</sup>, and the floor of the box shall be not less than 6 inches below the outlet of the collection system.

Spring box overflows, if needed, shall meet the requirements found in the FOTG, Watering Facility (614) – Conservation Practice Standard.

**Outlets.** The outlet pipe from a spring box shall be placed not less than 6 inches above the floor, to provide a sediment trap. The spring outlet pipe shall be at the same elevation or lower than the collector pipe outlet to prevent reduced spring flow. The intake to the outlet pipe shall be screened as necessary, and installed to the box with a watertight connection.

The outlet pipe must have positive grade away from the spring box or collection system unless vent pipe(s) are added to prevent air locks

The outlet pipe shall have minimum 1-1/4 inches (3-cm) diameter. In lieu of site-specific spring flow and pipe vent calculations, the outlet pipe shall have the following minimum size based on line grades:

1. 1-1/4 inches inside diameter for line grades greater than 1.0 percent.
2. 1-1/2 inches inside diameter for line grades greater than or equal to 0.5 percent but less than or equal to 1.0 percent.
3. 2 inches inside diameter for lines grades less than 0.5 percent.

Minimum outlet pipe material and strength requirements shall equal those found in the FOTG, Pipelines (516) Conservation Practice Standard

Tanks, troughs or fountains.

Stockwater requirements for tanks, troughs and fountains shall comply with the FOTG Watering Facility (614) Conservation Practice Standard.

**Appurtenance Protection.** Measures shall be included to protect appurtenances from

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damage by freezing, flooding, sedimentation, contamination, vehicular traffic, and livestock.

Providing sufficient earth cover, diversions, dikes and fencing shall be utilized where necessary.

**Wildlife Habitat Protection.** Spring developments with the potential to jeopardize wetlands, bogs, fens, or other unique ecological sites shall be designed with measures required to maintain the existing habitat, unless acceptable mitigation is provided. A functional assessment will be made at potential spring development areas to determine existing ecological functions and/or potential losses.

**Vegetative Establishment.** Establishing vegetation on disturbed areas shall be in accordance with the FOTG, Critical Area Planting (342) Conservation Practice Standard.

### CONSIDERATIONS

Considerations when determining the suitability of a site for development shall include the need and feasibility of protection from contaminants and potential damage to cultural resource areas, wetlands, potential changes in surface water flow, riparian areas, woody cover, and existing wildlife habitat.

A shutoff valve and vent system on the spring outlet pipe should be considered for winter shutdown, flow control, and maintenance.

Native vegetation adapted to wet conditions may be used as an alternative to introduced grasses on some wet sites.

If a spring box is not used, consideration should be given for an access point and a clean out method for supply and delivery lines.

When geo-textile envelope systems are used for collection, the soils and likely turbid installation conditions at the site should be evaluated in selection of the geo-textile to be used.

### PLANS AND SPECIFICATIONS

Plans and specifications for installing spring developments shall be in keeping with this standard and shall describe the requirements

for applying the practice to achieve its intended purpose.

Construction specifications should include the following requirement as necessary for the job:

All loose rock, logs, sediment and vegetation that may obstruct the free discharge of the spring shall be removed and disposed of so that they will not endanger the spring development.

### OPERATION AND MAINTENANCE

The operation and maintenance plan shall include such items as winter freeze and flooding protection, overflow and valve operations, erosion, spring box sediment removal, rodent damage repair, maintaining vegetative cover and stable outlet, and other site specific items as needed.

Operation and maintenance plans for ecologically sensitive sites shall include specific valve installation and operation requirements to protect existing site habitat values.

The plan should provide for periodic inspections and prompt repair or replacement of damaged components.

### REFERENCE

National Engineering Handbook—Part 650—Engineering Field Handbook, Chapter 12, Springs and Wells.